BEFORE THE ADMINISTRATOR OF THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PETITION FOR RECONSIDERATION

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PETITION FOR RECONSIDERATION OF EPA'S DENIAL OF FRIENDS OF THE EARTH'S OCTOBER 3, 2006 PETITION FOR RULEMAKING SEEKING THE REGULATION OF LEAD EMISSIONS FROM GENERAL AVIATION AIRCRAFT UNDER § 231 OF THE CLEAN AIR ACT AND PETITION FOR RULEMAKING SEEKING THE REGULATION OF LEAD EMISSIONS FROM GENERAL AVIATION AIRCRAFT UNDER § 231 OF THE CLEAN AIR

April 21, 2014

INTRODUCTION AND SUMMARY OF PETITION

On October 3, 2006, Friends of the Earth ("FoE") submitted a Petition for Rulemaking (the "Petition") with the Administrator of the U.S. Environmental Protection Agency ("EPA"). In the Petition, FoE asked EPA to find that lead emissions from aviation aircraft using leaded aviation gasoline ("avgas") contribute to lead air pollution that may endanger public health or welfare. On July 18, 2012, nearly six years after the Petition was filed, EPA denied FoE's

request for an endangerment finding.[1] This Petition seeks reconsideration of that denial and affirmatively requests that EPA make an endangerment finding.

The basis of this Petition is simple and straightforward. The only showing required for a finding of endangerment is that lead emissions from aircraft engines fueled by leaded aviation gasoline cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare. In this case, both prongs of that test have been met. By categorizing lead as a criteria pollutant and promulgating National Ambient Air Quality Standards ("NAAQS") for lead, EPA has already determined conclusively that lead is a pollutant that may reasonably be anticipated to endanger public health or welfare. EPA also has determined that lead emissions from aircraft engines fueled by leaded aviation gasoline constitute the largest single contributing source to overall airborne lead pollution. In so doing, EPA has established that emissions from aircraft using leaded aviation gasoline cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare. There is no need for further study. EPA has all of the evidence it needs to make an endangerment finding.[2]

PETITION

Pursuant to the Right to Petition Government Clause contained in the First Amendment of the United States Constitution, the Administrative Procedure Act, and the Clean Air Act ("CAA"), petitioners file this Petition for Reconsideration with the Administrator and respectfully request the following:

(1) That the Administrator reconsider the denial of FoE's October 3, 2006 Petition;

(2) That the Administrator find that lead emissions from general aviation aircraft cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare; and

(3) That after the Administrator makes an endangerment finding, the Administrator commence the rulemaking process and issue proposed emission standards for lead from general aviation aircraft under §231(a)(2)(A) of the CAA.

PETITIONERS

Friends of the Earth

Petitioner FoE is a tax-exempt environmental advocacy organization founded in 1969 and incorporated in the District of Columbia, with offices in Washington, DC and Berkeley,

[1] Memorandum from EPA Administrator in Response to Petition Regarding Lead Emissions from General Aviation Aircraft Piston-Engines (Jul. 18, 2012), *available at* http://www.epa.gov/otaq/regs/nonroad/aviation/ltr-response-av-ld-petition.pdf [hereinafter "EPA's Response"].

[2] As discussed below, after EPA finds endangerment, it should take immediate steps to start phasing out the use of leaded aviation gasoline.

California. As of April 2014, FoE had more than 23,600 members across all 50 states in the United States and more than 235,000 activists. FoE is part of Friends of the Earth International, a federation of grassroots groups working in 74 countries on today's most urgent environmental and social issues.

FoE's mission is to defend the environment and champion a healthy and just world. To this end, one of FoE's key programs is the promotion of policies and actions that prevent air pollution and that minimize the negative impacts of pollution on human health. FoE relies on sound science and uses the law to create and advocate for innovative strategies to conserve natural resources and protect public health and the environment. A core element of FoE's mission is work to reduce air and water pollution throughout the United States. To these ends, FoE actively engages in rulemaking efforts before EPA and other regulatory agencies relating to the regulation of industrial sources of air and water pollution and in litigation to support these efforts.

Physicians for Social Responsibility

Physicians for Social Responsibility ("PSR") is the largest physician-led nonprofit organization in the U.S. working to slow, stop and reverse global warming and toxic degradation of the environment. Founded in 1961, PSR has a national network of 50,000 health professionals and concerned citizen members and e-activists, twenty-five PSR chapters in nineteen states, and roughly thirty student PSR chapters at medical and public health schools. In 1992, recognizing that new dangers threaten our communities, PSR expanded its mission to include environmental health. Since then, PSR has brought the medical and public health perspective to protect today's and future generations from the health effects of global warming and toxic degradation of the environment. PSR strives to educate and activate the medical and broader health community, and the public, through research, analysis, collaboration, and targeted communications. PSR advocates for government and societal change at the local, state, and national level. PSR has been active in identifying and combating the effects of lead exposure, particularly the effects on children, through its research, advocacy, and educational activities. PSR played a key role in the passage of the National Housing Bill of 1992, which significantly reduced the amount of lead in drinking water in the United States. More recently PSR's Los Angeles chapter co-sponsored The Childhood Lead Poisoning Prevention Act of 2007, which sought to increase the number of children tested for lead poisoning by utilizing the state's immunization program.

Oregon Aviation Watch

Oregon Aviation Watch ("OAW") is a non-profit organization dedicated to research, education and advocacy on behalf of the public interest and public welfare regarding aviation issues. OAW seeks to enhance and protect the quality of life for Oregon residents by eliminating the adverse impacts of aviation activity, as well as achieve a transparent, accountable, and sustainable aviation system that neither disregards nor diminishes the environment, livability, health, or well-being of current and future generations of Oregon residents. OAW provides information on aviation policy in Oregon and nationally, and shares its experiences dealing with these issues. OAW strives to reduce the sense of isolation and powerlessness people sometimes feel when confronted with the bureaucratic runaround and lack of democratic principles so often

encountered when dealing with aviation issues. To further these goals OAW has gathered and written numerous articles on the subject of lead pollution from piston craft airplanes, and has filed requests and motions with local airports to install monitoring equipment to further show the effects and dangers of leaded avgas. OAW also provides regular email updates to a broad base of local supporters, elected officials and environmental organizations to keep the public apprised of current aviation issues. OAW is active at the local level in ensuring decision-makers take into account the health and well-being of communities who live near airports throughout Oregon.

PETITION HISTORY

Over ten years ago, FoE brought the issue of lead emissions from general aviation aircraft to the attention of EPA in a letter requesting that the Agency make an endangerment finding regarding such emissions.[3] Two years later EPA responded, stating that there was insufficient evidence for EPA to make a determination that aircraft lead emissions could be reasonably anticipated to endanger public health or welfare.[4]

On October 3, 2006, FoE submitted a Petition for Rulemaking with EPA (the "2006 Petition"). In the 2006 Petition, FoE again asked EPA to find that lead emissions from general aviation aircraft endanger public health or welfare. FoE also requested that EPA issue a proposed emissions standard for lead from general aviation aircraft. On November 16, 2007, EPA requested public comment on the 2006 Petition.[5] FoE submitted comments to EPA on March 18, 2008.

On April 28, 2010, EPA issued an Advanced Notice of Proposed Rulemaking ("ANPR").[6] In the ANPR, EPA acknowledged the serious health effects associated with exposure to lead at much lower levels than previously identified.[7] The ANPR also confirmed that aircraft fueled by leaded aviation gasoline constitute "the largest single source category for emissions of lead to air, comprising approximately half of the national inventory."[8] The ANPR further noted that communities living near airports, children attending schools near airports, and airline pilots are all at risk of exposure to lead from these aircraft.[9] Nevertheless, the ANPR sought further public input regarding the 2006 Petition.[10]

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[3] Letter from Golden Gate Univ. to EPA Administrator (Dec. 12, 2003), *available at* http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2002-0030-0106 (In 2003, FoE was known as the Bluewater Network).

[4] EPA, Emissions Standards and Test Procedures for Aircraft and Aircraft Engines: Summary and Analysis of Comments 40-43 (Nov. 2005).

[5] Petition Requesting Rulemaking to Limit Lead Emissions from General Aviation Aircraft; Request for Comments, 72 Fed. Reg. 64,570 (proposed Nov. 16, 2007).

[6] Advance Notice of Proposed Rulemaking on Lead Emissions From Piston-Engine Aircraft Using Leaded Aviation Gasoline, 75 Fed. Reg. 22,439 (proposed Apr. 28, 2010) [hereinafter "ANPR"].

[7] *See id.* The ANPR also admitted that EPA's review of lead air quality standards in 2008 did not identify a safe level of lead emissions.

[8] *Id.* at 22,442.

[9] *Id.* at 22,459-463.

[10] *Id.* at 22,441.

On July 18, 2012, nearly six years after the 2006 Petition was filed, EPA issued its Memorandum in Response to Petition Regarding Lead Emissions from General Aviation Aircraft Piston-Engines denying FoE's request for an endangerment finding.[11] EPA suggested that more data regarding demographics and air lead levels at and around airports would allow EPA to make a judgment on whether lead emissions from aircraft fueled by leaded aviation gasoline are a danger to public health.[12] EPA also suggested that additional studies were necessary "since previous airport modeling studies had not focused on identifying near-field gradients in lead concentrations from piston-engine aircraft, or attempted to differentiate aircraft lead emissions from other sources of ambient air lead (e.g., roadways)."[13] EPA estimated that it would take up to three years in order to make a judgment on whether lead emission from general aviation aircraft piston engines cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare.[14]

FACTUAL BACKGROUND

1. EPA's Recognition of the Health Impacts of Airborne Lead.

More than forty years ago, in 1973, EPA concluded that airborne lead was a danger to public health including "a significant risk of harm to the health of urban population groups, especially in children" and required a phase out of lead used in motor vehicle gasoline.[15] Three years later, in 1976, EPA listed lead as a pollutant that "cause[s] or contribute[s] to air pollution which may reasonably be anticipated to endanger public health or welfare" and is emitted "from numerous or diverse mobile or stationary sources." [16]

In 1978, EPA stated that "it remains the Agency's belief that airborne lead directly and indirectly contributes to the risk of adverse health consequences and that sufficient clinical and epidemiological evidence is available to form a judgment as to the extent of this contribution."[17] EPA further found that an increase in airborne lead produces increases in blood lead levels that cause human health risks such as "permanent, severe, neurological damage or death."[18]

A few years later, in 1982, EPA restated that increased use of lead in gasoline should be avoided out of "concern over the impact of total environmental loadings of lead, including exposures that may result from contaminated soil, dust, water," and foodstuffs.[19] Then, in 1986, EPA revised its "Air Quality Criteria" for lead, recognizing that lead is more dangerous than

[11] *See* EPA's Response.

[12] *Id.*at 5.

[13] *Id.* at 8.

[14] *Id.* at 15.

[15] ANPR at 22,446.

[16] Addition of Lead to List of Air Pollutants, 41 Fed. Reg. 14,921, 14,921 (Apr. 8, 1976); 42 U.S.C. § 7408(a)(1)(A), (a)(1)(B).

[17] National Primary and Secondary Ambient Air Quality Standards for Lead, 43 Fed. Reg. 46,246, 46,250 (Oct. 5, 1978).

[18] *See id.* at 46,247.

[19] Regulation of Fuels and Fuel Additives, 47 Fed. Reg. 38,070, 38,076 (Aug. 27, 1982).

EPA had previously found.[20] EPA concluded that reducing lead air pollution would "result in significant widespread reductions in levels of lead in human blood."[21] EPA also again recognized that children have a greater risk for experiencing lead induced health effects.[22]

In 2001, EPA admitted that "there is no known threshold for lead."[23] Then, in 2008, EPA again tightened air quality standards for lead due to increased evidence that demonstrates adverse health effects occurring at lower lead levels than previously thought.[24] EPA further recognized that airborne lead emissions can continue to harm human health for years: "[o]nce deposited out of the air, [lead] can subsequently be resuspended into the ambient air and, because of the persistence of [lead], [lead] emissions contribute to media concentrations for some years into the future."[25] In 2010 and 2011, EPA designated many areas of the country as not meeting the air quality standards it set for airborne lead concentrations.[26]

EPA continued to find a wide array of serious negative health effects – due to lead exposure – at lower and lower levels in adults and especially in children.[27] EPA acknowledged that "the neurotoxic effects of Pb are not generally reversible."[28] As EPA also noted, more than 6,000 studies on lead's health effects have come out since 1990 showing that "[e]xposures to low levels of lead early in life have been linked to effects on IQ, learning, memory, and behavior."[29] EPA has also continued to acknowledge that the health effects from airborne lead exposure are known to occur at much lower levels than experts originally believed.[30] In particular, EPA has explicitly stated that, "the epidemiologic and toxicological study findings show that progressively lower blood [lead] levels or [lead] exposures are associated with cognitive deficits in children."[31]

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[20] *See* EPA, Air Quality Criteria for Lead 1-159 (June 1986), *available at* http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2007-0294-0178.

[21] *Id.*

[22] *Id.*; *see also* National Ambient Air Quality Standards for Lead, 73 Fed. Reg. 66,964, 66,968 (Nov. 12, 2008) (characterizing lead poisoning as the "number one environmental threat to the health of children in the United States").

[23] Lead: Identification of Dangerous Lead Levels, 66 Fed. Reg. 1206, 1215 (Jan. 5, 2001); *see also* National Ambient Air Quality Standards for Lead, 73 Fed. Reg. 66,964 at 66,968 (acknowledging that "there is now no recognized safe level of [lead] in children's blood").

[24] National Ambient Air Quality Standards for Lead, 73 Fed. Reg. 66,964.

[25] *Id.* at 66,971.

[26] *See* Air Quality Designations for the 2008 Lead (Pb) National Ambient Air Quality Standards, 75 Fed. Reg. 71,033 (Nov. 22, 2010) (codified at 40 C.F.R. Part 81); *see also* Air Quality Designations for 2008 Lead (Pb) National Ambient Air Quality Standards, 76 Fed. Reg. 72,097 (Nov. 22, 2011) (codified at 40 C.F.R. Part 81) (identifying additional areas that fail to meet national ambient air quality standards for lead).

[27] 73 Fed. Reg. at 66,975-76.

[28] EPA, Integrated Science Assessment for Lead 1-76 (June 2013).

[29] *See* EPA's Response at 11.

[30] *See* EPA, Integrated Science Assessment for Lead lxxi-lxxiv

[31] *Id.* at 1-73.

2. EPA's Longstanding Knowledge of Lead Emissions from Aircraft

The 1970 Clean Air Act required EPA to conduct a study about the impact that pollutants from aircraft emissions have on air quality.[32] In April 1972, EPA issued the study and recognized that general aviation aircraft emitted lead.[33] Modeling in the study indicated that lead pollutant concentrations would increase due to the use of leaded aviation gasoline.[34] In that report, EPA acknowledged that a switch to "low-lead or lead-free fuel" was required to address airborne lead emissions.[35]

In 2002, in the National Emissions Inventory ("NEI"), EPA found that lead emissions from avgas were the largest source category.[36]

In June 2002, EPA released an Action Plan to address the dangers to human health from exposure to alkyl-lead compounds including leaded avgas.[37] In the plan, EPA stated that "[r]esearch has clearly shown that exposure to alkyl-lead can cause serious toxic effects to the nervous system of humans, with the potential to cause neurological disorders."[38] EPA further explained that exposure to alkyl-lead "may still pose a threat to certain populations."[39] To address this threat, EPA says that it will continue to dialogue with the FAA on the use of leaded avgas "and the possibilities of reducing the lead content and/or replacing leaded gasoline with unleaded gasoline."[40]

In 2006 and 2007, EPA studied lead emissions from the Santa Monica Airport in California.[41] EPA reported that "ambient lead increased with increasing proximity to the airport."[42] The data from this study "suggest that piston-engine activity can increase ambient lead concentrations in downwind neighborhood sites, resulting in levels that are four to five times higher than background levels and maximum impact site concentrations that are up to 25 times higher than background lead levels."[43]

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[32] 42 U.S.C. §7571.

[33] EPA, Aircraft Emissions: Impact on Air Quality and Feasibility of Control 8 (Apr. 1972).

[34] *Id.* at 8, 32 (EPA modeling projecting that lead emissions from aircraft were expected to increase at five of the six airports within the study).

[35] *Id.* at 48 (Table 19 recommending engine modifications to control emissions).

[36] Petition Requesting Rulemaking to Limit Lead Emissions from General Aviation Aircraft; Request for Comments, 72 Fed. Reg. at 64,571.

[37] EPA, Persistent Bioaccumulative and Toxic Pollutants Program National Action Plan For Alkyl-lead 2 (June 2002), *available at* http://www.epa.gov/pbt/pubs/Alkyl_lead_action_plan_final.pdf (Alkyl-leads are man-made compounds commonly used as fuel additives "to reduce 'knock' in combustion engines" and "to help lubricate internal engine components").

[38] *Id.*

[39] *Id.* at 3.

[40] *Id.*at 4.

[41] ANPR at 22,458.

[42] *Id.*

[43] *Id.*

In the 2010 ANPR, EPA estimated that lead from general aviation aircraft engines is released at approximately 20,000 airports throughout the country.[44] EPA also estimated that there were 16 million people[45] and three million children residing and attending school in close proximity to airports that service general aviation aircraft operating on leaded avgas.[46] EPA further acknowledged that lead from aircraft was "the largest single source category for emissions of lead to air" and comprises "approximately half of the national inventory [of lead emissions]."[47] EPA then recognized that lead monitoring studies conducted near airports described in the ANPR "indicate that lead levels in ambient air on and near airports servicing piston-engine aircraft are higher than lead levels in areas not directly influenced by a lead source."[48]

In June 2013, EPA released some data from its air quality monitoring studies from airports around the country.[49] The data from two airports in California revealed exceedances of the NAAQS for lead.[50] The McClellan-Palomar Airport in San Diego[51] and the San Carlos Airport in San Carlos both exceeded the maximum three-month average standard for lead.[52]

Also in June 2013, EPA's Integrated Science Assessment again recognized that "[d]irect emissions of Pb into the atmosphere primarily come from piston-engine aircraft…"[53] EPA further admitted that higher emitting airports are likely to be closer to highly populated areas:

> Pb emissions from piston-engine aircraft operating on leaded fuel are estimated to occur at approximately 20,000 airports across the U.S. Many of the more active airports are more numerous in highly populated metropolitan regions, which suggests that emissions from piston-engine aircraft may be higher in these locations compared with rural areas.[54]

[44] *Id.* at 22,442.

[45] *Id.* at 22,460,

[46] *Id.* at 22,461.

[47] *Id.* at 22,442.

[48] *Id.*

[49] EPA, Program Update: Airport Lead Monitoring (June 2013), *available at* http://www.epa.gov/otaq/regs/nonroad/aviation/420f13032.pdf.

[50] *Id.* at 2.

[51] EPA, Monitoring The Air for Lead Near the McClellan-Palomar Airport and Gillespie Field 2 (June 2013), *available at* http://www.epa.gov/region9/air/airport-lead/sandiego-lead-factsheet.pdf.

[52] EPA, Monitoring the Air for Lead Near the San Carlos Airport 1 (June 2013), *available at* http://www.epa.gov/region9/air/airport-lead/sancarlos-lead-factsheet.pdf.

[53] EPA, Integrated Science Assessment For Lead 2-4 (June 2013), *available at* http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=255721#Download.

[54] *Id.* at 2-5.

BASIS OF PETITION FOR RECONSIDERATION

This Petition for Reconsideration is based on the following:

1. EPA improperly applied the law governing endangerment findings, and ignored its own prior interpretation of that law, by conflating the two prongs of the test for finding endangerment;

2. EPA has long known that lead air pollution presents serious risks to human health and that lead emissions from general aviation aircraft contribute to overall lead air pollution; and

3. Scientific developments that have occurred since the Petition was filed and since EPA's Response further emphasize the need for urgent action by EPA. Studies show that children in particular suffer irreversible neurological and cognitive damage as a result of exposure even to very small amounts of airborne lead, damage that continues to be inflicted as EPA fails to act.

SECTION 231 OF THE CLEAN AIR ACT AND EPA'S INTERPRETATION OF THE TWO-PART TEST FOR ENDANGERMENT FINDINGS

Section 231(a)(2)(A) of the CAA requires that the EPA Administrator "shall, from time to time, issue proposed emission standards applicable to the emission of any air pollutant from any class or classes of aircraft engines which in [her] judgment causes, or contributes to, air pollution which may reasonably be anticipated to endanger public health or welfare."[55] The exercise of the Administrator's judgment—commonly referred to as an endangerment and cause or contribute finding or simply an endangerment finding—entails a two-part inquiry:[56]

1. Whether the specific type air pollution at issue, when considered cumulatively, "may reasonably be anticipated to endanger public health or welfare;"[57] and, if so

2. Whether emissions of the pollutant from a class of aircraft engines cause or contribute to the cumulative air pollution.[58]

When both prongs are met, the Agency must issue proposed emission standards for the source category in question.

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[55] 42 U.S.C. § 7571(a)(2)(A).

[56] *See* Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act,-74 Fed. Reg. 18,886, 18,890 (Apr. 24, 2009).

[57] *Id.*

[58] *See* Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496, 66,506 (Dec. 15, 2009) [hereinafter "GHG Endangerment Finding"] (interpreting the parallel endangerment finding standard for motor vehicles, the EPA stated that "the Administrator is to consider the cumulative impact of sources of a pollutant in assessing the risks from air pollution, and is not to look only at the risks attributable to a single source or class of sources" and that the Administrator "need not find that emissions from any one sector or group of sources are the sole or even the major part of an air pollution problem").

EPA's Response states that the Agency intends to follow a general approach similar to that used to make an endangerment finding regarding greenhouse gas emissions from motor vehicles under CAA Section 202(a), which contains the same two-prong endangerment standard as Section 231.[59] In this case, however, the reasoning behind EPA's endangerment and cause or contribute findings for greenhouse gases, in particular the strong emphasis on the preventive or precautionary nature of the CAA and the predominate value of protecting public health,[60] argues for an immediate endangerment finding rather than for additional studies. Recognizing the two-part test of Section 202(a), former Administrator Jackson interpreted her obligations regarding endangerment findings as follows:

1. "[T]he Administrator is required to protect public health and welfare, but she is not asked to wait until harm has occurred."[61]

2. "[T]he Administrator is to exercise judgment by weighing risks, assessing potential harms, and making reasonable projections of future trends and possibilities."[62]

3. "[T]he Administrator is to consider the cumulative impact of sources of a pollutant in assessing the risks from air pollution, and is not to look only at the risks attributable to a single source or class of sources."[63]

4. "[T]he Administrator is to consider the risks to all parts of our population, including those who are at greater risk for reasons such as increased susceptibility to adverse health effects. If vulnerable subpopulations are especially at risk, the Administrator is entitled to take that point into account in deciding the question of endangerment."[64]

5. The Administrator "need not find that emissions from any one sector or group of sources are the sole or even the major part of an air pollution problem. The use of the term 'contribute' clearly indicates a lower threshold than the sole or major cause. Moreover, the statutory language in CAA section 202(a) does not contain a modifier on its use of the term contribute. Unlike other CAA provisions, it does not require 'significant' contribution."[65]

This articulation of the Administrator's responsibilities is consistent with the recent D.C. Circuit decision that held that EPA need not provide "rigorous step-by-step proof of cause and effect" to make an endangerment finding.[66] "'Awaiting certainty will often allow for only

[59] EPA's Response at 5.

[60] GHG Endangerment Finding at 66,506–07.

[61] *Id.* at 66,505.

[62] *Id.*

[63] *Id.* at 66,506.

[64] *Id.*

[65] *Id.*

[66] *Coal. for Responsible Regulation v. EPA*, 684 F.3d 102, 121 (D.C. Cir. 2012) (quoting *Ethyl Corp. v. EPA*, 541 F.2d 1, 28 (D.C. Cir. 1976)).

reactive, not preventive, regulation.'"[67] Rather, regulatory action may be taken before the threatened harm occurs; "indeed, the very existence of such precautionary legislation would seem to demand that regulatory action precede, and, optimally, prevent, the perceived threat." [68]

ARGUMENT

A. UNDER EPA'S OWN INTERPRETATION OF THE CAA, LEAD EMISSIONS FROM GENERAL AVIATION AIRCRAFT ENGINES CONTRIBUTE TO LEAD AIR POLLUTION WHICH MAY REASONABLY BE ANTICIPATED TO ENDANGER PUBLIC HEALTH OR WELFARE.

EPA has refused to find that lead emissions from general aviation aircraft engines "cause[], or contribute[] to, air pollution which may reasonably be anticipated to endanger public health or welfare."[69] However, under the standards followed by the EPA in its endangerment finding for greenhouse gases, there is no reasonable basis for this refusal. EPA cannot deny that airborne lead is a pollutant which may reasonably be anticipated to endanger public health or welfare—EPA has determined that fact conclusively. Nor is there a basis for denying that lead emissions from general aviation aircraft contribute to overall airborne lead pollution—EPA has already established that the largest single source of such pollution is aircraft engines fueled by leaded gasoline. The purported justifications given by EPA for denying an endangerment finding are simply an exercise in avoidance of these two facts, which are the only two facts EPA need consider before finding endangerment. EPA's contention that further study is required is simply incorrect.

1. Lead Air Pollution May Reasonably Be Anticipated to Endanger Public Health or Welfare.

Section 231 does not require a showing that lead emissions for avgas-fueled aircraft endanger public health, only that lead air pollution—on the whole—may be reasonably anticipated to endanger public health or welfare.[70] By focusing on whether exceedances of the NAAQS exist near general aviation airports that service planes fueled by leaded avgas, EPA improperly conflates the "reasonably anticipated to endanger" prong with the "causes or contributes to air pollution" prong.

EPA's Response failed to address the two parts of the endangerment test separately. Rather, it treated the issue as if the pertinent question is whether leaded avgas, by itself, causes harm to public health or welfare. EPA's own interpretation of the law, however, makes clear that the two prongs are separate inquiries. The first prong requires only a determination whether the specific type of air pollution at issue, when considered cumulatively, "may reasonably be anticipated to endanger public health or welfare." EPA need only have a *reasonable anticipation*

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[67] *Id.*

[68] *Ethyl Corp.*, 541 F.2d at 13.

[69] 42 U.S.C. § 7571(a)(2)(A).

[70] *Id.*; *see also* GHG Endangerment Finding at 66,506.

that the pollution in question will endanger public health or welfare in order to make an endangerment finding; it need not possess proof of actual harm.[71] Undeniably, "[a] statute allowing for regulation in the face of danger is, necessarily, a precautionary statute. Regulatory action may be taken before the threatened harm occurs; indeed, the very existence of such precautionary legislation would seem to demand that regulatory action precede, and, optimally, prevent, the perceived threat."[72]

EPA has recognized that no safe threshold for lead exists, and that lower and lower levels of lead exposure are associated with adverse health effects. As part of its most recent review of the NAAQS for lead, EPA acknowledged that with each successive assessment to-date, "the epidemiologic and toxicological study findings show that progressively lower blood Pb levels or Pb exposures are associated with cognitive deficits."[73] EPA has found a positive causal relationship between exposure to lead and negative effects to human health, including nervous system effects, cardiovascular effects, renal effects, immune system effects, reproductive and developmental effects, and effects on heme synthesis and red blood cell function, and considers a causal relationship between lead exposure and cancer likely.[74]

In reality, this is not a case where reasonable anticipation is even in question. As detailed above, as well as in FoE's notice letter and complaint, EPA has long possessed evidence of the severity of the effects of lead air pollution on human health.[75] Indeed, EPA already has determined conclusively that lead air pollution "may reasonably be anticipated to endanger public health or welfare."[76] Having made the determination that airborne lead is a pollutant that may reasonably be anticipated to endanger public health or welfare, EPA cannot now argue to the contrary. Thus, the first prong of the endangerment test is met as a matter of law.

2. Lead Emissions from General Aviation Aircraft Engines Contribute to Overall Lead Air Pollution.

Under Section 231, the Administrator "need not find that emissions from any one sector or group of sources are the sole or even the major part of an air pollution problem" in order to find a contribution to air pollution.[77] "[T]he cause or contribute test is designed to authorize

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[71] 42 U.S.C. § 7571(a)(2)(A); *see also Ethyl Corp.*, 541 F.2d at 13–20.

[72] *Ethyl Corp.*, 541 F.2d. at 13.

[73] EPA, Integrated Science Assessment for Lead 1-73

[74] *See id.* at lxxxii-lxxxviii.

[75] *See* ANPR at 22,449 ("Lead has been demonstrated to exert 'a broad array of deleterious effects on multiple organ systems via widely diverse mechanisms of action'" and "has been classified as a probable human carcinogen."); *see also Ethyl Corp.*, 541 F.2d at 19 ("Undoubtedly, the harm caused by lead poisoning is severe.").

[76] As of November 2011, EPA had identified 21 different areas of the United States where the revised NAAQS for airborne lead emissions were not being achieved. *See* Air Quality Designations for the 2008 Lead (Pb) National Ambient Air Quality Standards, 75 Fed. Reg. 71,033 (Nov. 22, 2010) (codified at 40 C.F.R. 81) (identifying 16 non-attainment areas). The increase of such nonattainment areas provides further evidence that lead air pollution may reasonably be anticipated to endanger public health or welfare. Moreover, every county that failed to meet NAAQS for airborne lead contains or is in close proximity to an airport where planes are fueled by leaded aviation gasoline.

[77] *See* ANPR at 22,445; *see also* GHG Endangerment Finding at 66,506 ("The use of the term 'contribute' clearly indicates a lower threshold than the sole or major cause. Moreover, the statutory language in CAA section 202(a)

EPA to identify and then address what may well be many different sectors or groups of sources that are each part of…the problem," and the contribution need not be deemed significant.[78] By way of contrast, other CAA provisions require "significant" contribution.[79] Indeed, EPA's position that it must complete monitoring at general aviation airports to determine whether NAAQS for lead are being exceeded appears more aligned with Section 213—CAA provisions governing emissions from non-road engines and vehicles—which calls for a determination of whether emissions of certain pollutants are "significant contributors" to pollution concentrations in nonattainment areas.[80]

As EPA readily admits, aircraft engines that burn leaded avgas constitute the largest single source category for airborne lead pollution in the nation.[81] These aircraft are responsible for approximately fifty percent of the lead emissions in the U.S.[82] For other pollution sources, EPA has found contribution for far smaller percentages.[83] For example, EPA's 2005 rule regulating nitrogen oxide ("NOx") emissions from aircraft was based on amounts that constituted only 0.7% of all NOx emissions in the country.[84] Similarly, EPA's endangerment finding for greenhouse gases was based on source categories responsible for about four percent of total global greenhouse gas emissions and for just over twenty-three percent of total U.S. greenhouse gas emissions.[85]

In defense of its refusal to make an endangerment finding and as justification for its proposal to conduct additional air modeling and monitoring, EPA claims a need to characterize the levels of lead in the ambient air at and around individual airports: "The levels of lead in the environment at and around airports is expected to vary significantly based on [a variety of factors]. In light of this, EPA faces a quite intensive investigation to understand the range of lead concentrations to which people are exposed from this source."[86] EPA's focus on whether emissions near airports cause lead NAAQS to be approached or exceeded is misplaced. Neither section 231 nor EPA's prior interpretation of the "endangerment and cause or contribute standard" requires the Agency to find emissions from or near a particular airport approach or

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does not contain a modifier on its use of the term contribute. Unlike other CAA provisions it does not require 'significant' contribution.").

[78] GHG Endangerment Finding at 66,506.

[79] *See, e.g.*, 45 U.S.C. § 7411(b); 45 U.S.C. §7547(a)(2), (4).

[80] *See* 42 U.S.C. § 7547(a)(2).

[81] ANPR at 22,442.

[82] *Id.*

[83] *Compare, e.g.*, 74 Fed. Reg. at 18,892 (noting that EPA found contribution for a source which was only 1.2 percent of the total inventory).

[84] Control of Air Pollution From Aircraft and Aircraft Engines; Emissions Standards and Test Procedures, 70 Fed. Reg. 69,664 at 69,668, 69,670 (Nov. 17, 2005) (codified at 40 C.F.R. 87)(EPA nonetheless (and correctly) justified the regulation because reducing 0.7% of all NOx emissions would "also help reduce levels of nitrogen dioxide (NO2), for which NAAQS have been established").

[85] *See* GHG Endangerment Finding at 66,537.

[86] EPA's Response at 5.

exceed the lead NAAQS in order for the EPA to make an endangerment finding.[87] Variation from airport to airport has no bearing on the basic fact that lead emissions from avgas contributes to airborne lead pollution. EPA's description of its investigation suggests an attempt to determine whether lead emissions specifically from avgas-fueled aircraft alone endanger human health, rather than whether they contribute to an overall pollution problem that the Agency already has determined may endanger health.

Moreover, as the "may reasonably be anticipated" language of section 231 affirms, the Clean Air Act is a precautionary statute under which proof of actual harm is not required. Congress directed that the regulatory action taken pursuant to an endangerment finding would be designed to "precede, and, optimally, prevent, the perceived threat."[88] EPA is not required to document "proof of actual harm" as a prerequisite to regulation; rather, EPA is supposed to act where there is "a significant risk of harm."[89] As the Court of Appeals for the District of Columbia emphasized:

> Sometimes, of course, relatively certain proof of danger or harm from such modifications can be readily found. But, more commonly, "reasonable medical concerns" and theory long precede certainty. Yet the statutes and common sense demand regulatory action to prevent harm, even if the regulator is less than certain that harm is otherwise inevitable.[90]

Simply put, further studies are not required and needlessly delay an endangerment finding that should be immediately issued.

3. Delaying an Endangerment Finding for Unnecessary Studies Is Causing Irreparable Harm to Children Now.

Children are a sub-population subject to disproportionate risks from airborne lead pollution. Airborne lead causes increased blood lead levels in children, which in turn causes cognitive impairment and IQ loss.[91] EPA concluded in 2006 that the latest evidence indicates adverse health effects, most notably among children, are occurring at much lower levels than previously considered.[92] EPA's current knowledge and the information available to it demand rapid action, not another round of studies. Federal policy requires EPA to prioritize the elimination of such hazards to children.[93] Rather than do so, EPA has chosen to conduct

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[87] Nevertheless, EPA's testing results for the Santa Monica Airport in 2008 showed raised air lead levels 900 meters downwind of runways and documented the potential for three-month averages that exceed the lead NAAQS.

[88] *Ethyl Corp.*, 541 F.2d 1, 13.

[89] *Id.* at 12-13.

[90] *Id.* at 25; *see also Massachusetts v. EPA*, 549 U.S. 497, 506 n. 7 (2007) (citing *Ethyl Corp*.).

[91] L.L. Brink, et al., *Do US Ambient Air Lead Levels Have a Significant Impact on Childhood Blood Levels: Results of a National Study*, J. Envtl. & Pub. Health (Aug. 2013), *available at* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3747402/.

[92] ANPR, at 22,441.

[93] Exec. Order No. 13,045, 62 Fed. Reg. 19,885 (Apr. 21, 1997); *see also* EPA, Guide to Considering Children's Health When Developing EPA Actions: Implementing Executive Order 13045 and EPA's Policy on Evaluating Health Risks to Children 5 (Oct. 2006) [hereinafter "Children's Health"], *available at*

unnecessary studies while children and infants continue to be harmed by the largest single source of airborne lead pollution.

Studies since EPA's 2006 ANPR continue to affirm the disproportionate impact of airborne lead on children. A recent 2013 study by the University of Pittsburgh determined that a significant relationship exists between ambient air lead and childhood blood lead levels in excess of 10 µg/dL.[94] That study determined that the proportion of children three years and younger with blood lead levels in excess of 10 µg/dL was 3.4 times higher in U.S. counties with the highest ambient lead levels than in those counties with low ambient air lead levels.[95] The study also stated that the percent change in the relative risk of total numbers of children with blood lead levels in excess of 10 µg/dL increases 36% for every 0.01 $\mu g/m^3$ increase in air lead value as established by EPA's National Air Toxics Assessment.[96]

Lead emissions from general aviation aircraft, in particular, have been associated with elevated blood lead levels in children, even in areas with lower levels of ambient air lead. A recent study by the Nicholas School of the Environment at Duke University ("the Miranda Study") examined the question of whether there is a relationship between aircraft lead emissions and the blood lead levels of children living in six counties in North Carolina.[97] The six counties contained a total of 66 general aviation airports with estimated lead emissions 2.634 tons per year collectively. None of the counties studied were in an area in which ambient air lead levels exceeded the NAAQS. None of the counties had an airport that required monitoring for lead under current EPA rules.

The Miranda Study determined that there is a significant association between potential exposure to lead emissions from avgas and blood levels in children.[98] The study concluded that children living within 1000 meters of an airport that served aircraft fueled by leaded aviation gasoline had elevated blood lead levels, with the largest impact evident on children living within 500 meters of such airports.[99]

It is increasingly clear that even slight elevations in blood lead levels do damage to children in the form of cognitive impairment and reduced IQ levels.[100] There is no "safe" level

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http://yosemite.epa.gov/ochp/ochpweb.nsf/content/ADPguide.htm/$File/EPA_ADP_Guide_508.pdf; *see generally* Devon Payne-Sturges & Debra Kemp, *Ten Years of Addressing Children's Health Through Regulatory Policy at the U.S. Environmental Protection Agency*, 116 Envtl. Health Perspectives 1720 (Dec. 2008); s*ee generally* U.S. Gen. Accounting Office, Environmental Health: EPA Has Made Substantial Progress but Could Improve Process for Considering Children's Health, 58-60 (Aug. 2013), *available at* http://www.gao.gov/assets/660/656922.pdf.

[94] Brink, et al., *supra,* at 6

[95] *Id.* at 7.

[96] *Id.* (noting also that "NATA lead estimates are known t be an underestimation of air lead levels").

[97] Marie Lynn Miranda,et al., *A Geospatial Analysis of the Effects of Aviation Gasoline on Childhood Blood Lead Levels*, 119 Envtl. Health Perpectives, 1513 (July 2011), *available at* http://ehp.niehs.nih.gov/1003231/.

[98] *Id.*

[99] *See id.*

[100] *See, e.g.*, Joel T. Nigg, et al., *Confirmation and Extension of Association of Blood Lead with Attention-Deficit/Hyperactivity Disorder (ADHD) and ADHD Symptom Domains at Population-Typical Exposure Levels*, The J. of Child Psychol. and Psychiatry, Jan. 2010 (linking ADHD to increases in blood lead levels).

of blood lead, or exposure to lead, especially for children.[101] The U.S. Center for Disease Control and Prevention ("CDC") and its predecessor agencies for many years have used blood lead level as a metric for identifying children at risk of adverse health effects and for specifying particular public health recommendations. The definition of "low level" lead exposure has been revised progressively downward as tools and study designs for evaluating neurodevelopment have evolved. Hints of health effects and intellectual impairment in children with blood lead levels below 10 µg/dL had already emerged by 1991, when CDC established 10 µg/dL as a level of concern.[102] A large body of recent research demonstrates negative health effects, including learning disabilities and behavioral disorders, associated with lead exposure levels well below the CDC action level.[103] Multiple studies suggest that early childhood blood lead levels as low as 2 µg/dL can have significant impacts on academic performance as measured by end-of-grade test scores.[104]

In June 2012 CDC concluded that it should eliminate the use of the term "blood lead level of concern" altogether, based on compelling evidence that even low blood lead levels are associated with IQ deficits, attention-related behaviors, and poor academic achievement.[105] The CDC concluded that because it could not identify a blood lead level that did not cause deleterious effects, combined with the evidence that these effects appear to be irreversible, it is critically important to prevent lead exposure rather than responding after the exposure has taken place.[106]

More recently, in 2013, EPA's monitoring at airports revealed that two airports in California were not meeting air quality standards for lead.[107] Both of these airports are located in urban areas, and thus expose those urban populations, which include children, to unsafe levels of lead.

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[101] 73 Fed. Reg. at 66,972.

[102] Steven G. Gilbert and Bernard Weiss, *A rationale for lowering the blood lead action level from 10 to 2 µg/dL,* Neurotoxicology, Sept. 2006, at 3, *available at* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2212280/.

[103] Miranda, et al., *Geospatial Analysis supra*; *see* Marie Lynn Miranda et al., *Early Childhood Lead Exposure and Exceptionality Designations for Students*, Int'l J. of Child Health and Hum. Dev. (2010); Marie Lynn Miranda et al., *Environmental contributors to the achievement gap*, 30 Neurotoxicology 1019 (Nov. 2009); *see also* Marie Lynn Miranda, et al., *The Relationship between Early Childhood Blood Lead Levels and Performance on End-of-Grade* Tests, 115 Envtl. Health Persp. 1242 (2007) (available via *http://dx.doi.org/)*; *see also* Richard L. Canfield, et al., *Intellectual Impairment in Children with Blood Lead Concentrations below 10 µg per Deciliter*, 348 New Eng. J.Med. 1517 (2003).

[104] *See, e.g.*, Miranda,et al., *Geospatial Analysis, supra*; Miranda, et al., *Early Childhood Lead Exposure, supra*; Miranda, et al., *Environmental contributors, supra*; Miranda, et al., *The Relationship between Early Childhood Blood Lead Levels and Performance on End-of-Grade Tests, supra*.; *see also* Canfield, et al., *Intellectual Impairment, supra*.

[105] CDC, *CDC Response to Advisory Committee on Childhood Lead Poisoning Prevention Recommendations in Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention*, 1 June 2012.

[106] The CDC adopted a reference value based on the 97.5th percentile of the blood lead level distribution among children 1–5 years old in the United States (currently 5 µg/dL) to identify children with elevated BLLs. Approximately 450,000 children in the United States already have blood lead levels higher than this reference value. *See id.*

[107] EPA, Monitoring The Air for Lead Near the McClellan-Palomar Airport and Gillespie Field 1-2 (June 2013), *available at* http://www.epa.gov/region9/air/airport-lead/sandiego-lead-factsheet.pdf; EPA, Monitoring the Air for Lead Near the San Carlos Airport 1 (June 2013), *available at* http://www.epa.gov/region9/air/airport-lead/sancarlos-lead-factsheet.pdf.

EPA acknowledges that there is no 'safe' threshold" for lead.[108] EPA has acknowledged that "the current evidence indicates the need for a standard level that is substantially lower than the current level to provide increased public health protection, especially for at-risk groups, including most notably children."[109] EPA also acknowledges that "with each successive [assessment to-date], the epidemiologic and toxicological study findings show that progressively lower blood Pb levels or Pb exposures are associated with cognitive deficits and behavioral impairments."[110]

The evidence that children are disproportionately at risk for harm from airborne lead pollution is overwhelming. The evidence that piston engine aircraft using leaded fuel constitute the single largest source contributor to lead air pollution is indisputable. There is no need for further study in order to find endangerment. Despite this clear evidence, EPA has chosen to conduct additional unnecessary studies. While EPA has delayed, another generation of children has been exposed to increased risk of cognitive deficits and behavioral impairment. Further delay and further damage to children is unwarranted.

4. EPA's Development of Emission Standards Does Not Justify Refusal to Make an Endangerment Finding for Lead from Aircraft.

EPA also appears to have confused its role in determining endangerment with its later role in determining how to regulate lead emissions from aircraft. EPA's Response stated:

> It is important to emphasize that EPA's technical work has very significant potential future implications. The aviation enterprise is unique and very different from any other transportation source. In the U.S. alone, there are literally millions of piston-engine aircraft operations each year from air taxis and general aviation which fly passenger and cargo over routes of various lengths, at different altitudes and with various payloads. *Understanding piston-engine aircraft operations and how many of the flight-specific variables affects lead emissions through models and other investigations is essential to a successful national regulatory program*. . . . An understanding of how all of the various aircraft and aircraft engine design (for piston-engine aircraft), and aircraft fuel factors interact to affect general aviation performance and lead *emissions is essential to the development of a well constructed program that achieves the desired public health and environmental consequences.*[111]

Irrespective of the eventual utility of understanding aircraft operations, the Clean Air Act does not require an investigation of such operations as part of EPA's undertaking an endangerment finding. As EPA noted in the greenhouse gas matter, Congress explicitly

[108] 73 Fed. Reg. at 66,964, 66,972.

[109] *Id*. at 66,985.

[110] EPA, Integrated Science Assessment for Lead, *supra,* at 1-73.

[111] EPA's Response at 16 (emphasis added).

separated two different decisions to be made and provided different criteria for each. The first decision involves the questions whether the air pollution may reasonably be anticipated to endanger public health or welfare, and the contribution to the air pollution by the sources. If affirmative endangerment and contribution findings are made, the second decision involves regulating the sources to control the emissions.[112] EPA's judgment in making the endangerment and contribution findings is constrained by the statute.[113] "'The statutory question is whether sufficient information exists to make an endangerment finding.' The effectiveness of a potential future control strategy is not relevant to deciding whether air pollution levels in the atmosphere endanger."[114]

When the issue of endangerment is considered under these statutory constraints, and particularly when considered in light of the scientific evidence that has become available since the 2006 Petition was filed, the answer is clear. Lead emissions from general aviation aircraft engines using leaded aviation gasoline contribute to airborne lead pollution, a criteria pollutant that is found in excess of EPA's ambient air quality standards in 21 different regions in the United States and that may reasonably be anticipated to endanger human health.

B. AFTER EPA MAKES AN AFFIRMATIVE ENDANGERMENT FINDING, IT SHOULD COMMENCE THE RULEMAKING PROCESS IMMEDIATELY AND BEGIN TO PHASE OUT LEADED AVGAS.

In EPA's Response to the Petition, EPA confirmed that once an endangerment finding is made, EPA will commence the rulemaking process.[115] After finding endangerment, EPA should immediately begin the rulemaking process.

Once the Administrator proposes emission standards, the Clean Air Act establishes a discrete set of steps the Administrator must take before finalizing the standards:

> (B)(i) The Administrator shall consult with the Administrator of the Federal Aviation Administration on aircraft engine emission standards.
>
> (ii) The Administrator shall not change the aircraft engine emission standards if such change would significantly increase noise and adversely affect safety.
>
> (3) The Administrator shall hold public hearings with respect to such proposed standards. Such hearings shall, to the extent practicable, be held in air quality control regions which are most seriously affected by aircraft emissions. Within 90 days after the issuance of such proposed regulations, he shall issue such regulations with such modifications as he deems appropriate. Such regulations may be revised from time to time.[116]

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[112] 74 Fed. Reg. at 66,506-07.

[113] *Massachusetts v. EPA*, 549 U.S. at 532.

[114] 74 Fed. Reg. 66,508, *quoting Massachusetts v. EPA*, 549 U.S. at 534.

[115] *See* EPA's Response at 18 (If EPA does find endangerment, "EPA would pursue the development of standards and potentially other requirements regulating lead emissions from general aviation piston-engine aircraft").

[116] 42 U.S.C. § 7571(a)(2).

EPA appears to be delaying rulemaking based on issues related to the nature of the industry, fuel supply, noise, or fuel safety.[117] This delay is inappropriate. Pursuant to Section 231 of the Clean Air Act, EPA considers noise and safety concerns in consultation with the FAA *after* proposing regulations, not before.[118] However, it is worth noting that much work has been done to prepare the way for rulemaking. New unleaded fuels are in development,[119] and 75% to 80% of piston engine aircraft no longer require leaded fuel at all.[120] When it finds endangerment, EPA can and should encourage the immediate use of unleaded fuels to start reducing the lead emissions from aviation gasoline as soon as possible.

CONCLUSION

For the reasons discussed above, lead emissions from general aviation aircraft contribute to air pollution which may reasonably be anticipated to endanger public health or welfare. Therefore, EPA should reconsider its refusal to make an endangerment finding and should initiate rulemaking procedures to establish standards for the emission of lead from aircraft engines.

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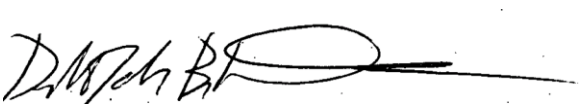
[117] *See* ANPR at 22,444 (noting that the comments EPA received in the last round of comments related mostly to fuel and industry issues and that no new information regarding health or exposure issues was supplied).

[118] 42 U.S.C. § 7571(a).

[119] As California House Representative Henry Waxman pointed out in a letter to FAA, "high octane unleaded auto and biodiesel fuels for piston engines have been safely and successfully used in Europe for many years, but adoption in the United States has been slow." Letter from Rep. Waxman Calls to Michael P. Huerta, Acting FAA Administrator (Oct. 23, 2012), *available at* http://waxman.house.gov/rep-waxman-calls-faa-reduce-lead-emissions-expanding-use-unleaded-fuel.Hjelmco's unleaded AVGAS 91/96 UL is approved for use by the major aircraft engine manufacturers Textron Lycoming, Teledyne Continental and Rotax. *See* Avgas 91/96 UL Overview, Hjelmco Oil, http://www.hjelmco.com/pages.asp?r_id=13395. Moreover, Shell Aviation has announced that it will be submitting its own unleaded avgas to FAA soon. *See* Press Release, Shell Aviation, Shell removes lead from light aircraft fuel(Dec. 3, 2013), *available at*, http://www.shell.com/global/products-services/solutions-for-businesses/aviation/news-and-library/press-releases/2013/press-release12032013.html.

[120] Rebecca Kessler, *Sunset for Leaded Aviation Gasoline?*, 121 Envtl. Health Persp. A54, A57 (Feb. 2013), *available at* http://ehp.niehs.nih.gov/pdf-files/2013/Feb/ehp.121-a54_508.pdf.

Respectfully submitted,



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